



A Review on Ebola (Ebola Virus Disease)

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ABSTRACT

Ebola is the most lethal Virus known to human. Its High fever is contagious illness that is often in humans and non-human primates like Monkey, Gorillas and chimpanzees. Ebola is a deadly disease caused by a virus. There are five strains and four of them can make people sick. After entering the body it kills cells making some of them explode. It wrecks the immune system causes heavy bleeding inside and outside of the body and damages almost every organ. The virus is scary but it's also rare. You can get it only from direct contact with an infected person's body fluids. As the disease gets worse, it causes bleeding inside the body as well as from the eyes, ears, and nose. Some people will vomit or cough up blood have bloody diarrhea and get a rash. The Ebola's signs and symptoms usually start between two days and three weeks after contracting the virus with a fever aching throat muscle pain and headaches. It kills 90% Ebola affected peoples. Ebola outbreaks all over central Africa. Ebola virus disease (EVD) first appeared 1976 in 2 coincident outbreaks one in Nzara and Sudan. After disease occurred in a village near the Ebola River from which the disease takes its name. the Ebola Preventing is Avoid to direct contact with the body fluid of infected people who has also surfing from that type of disease. Prevention focuses on avoiding contact with the viruses. Ebola has no licensed vaccines are available yet but 2 potential vaccines are undergoing human safety testing. Experimental vaccines and treatments for Ebola are under development but they have not yet been fully tested for safety or effectiveness. There are currently no proven treatment options that can kill the Ebola virus.

1. INTRODUCTION

Ebola virus disease (EVD) formerly known as Ebola hemorrhagic fever is a severe often fatal ailment in humans. Ebola is a rare but deadly virus that causes bleeding inside and outside of body. Ebola is a disease of humans and other primates is deadly ailment caused by virus there are five strains and four of them can make people sick. Signs and symptoms usually start between two days and three weeks after contracting the virus with a fever aching throat muscle pain and headaches. Then vomiting diarrhea and rash usually follow along with decreased function of the liver and kidneys. The disease has a high risk of death killing between 25 and 90

percent of those infected with an average of about 50 percent. This is often due to low blood pressure from fluid loss and normally follows six to sixteen days after symptoms emerge. The virus spreads by direct contact with body fluids such as blood of an infected human or other animals. The virus is transmitted to people from wild animals and spreads in the human inhabitants through human-to-human transmission. The average (EVD) case death rate is around 50%. Case death rates have varied from 25% to 90% in past outbreaks. The first EVD outbreaks occurred in remote villages in Central Africa near tropical rain forests but the most recent outbreak in West Africa has involved major urban as well as rural areas.

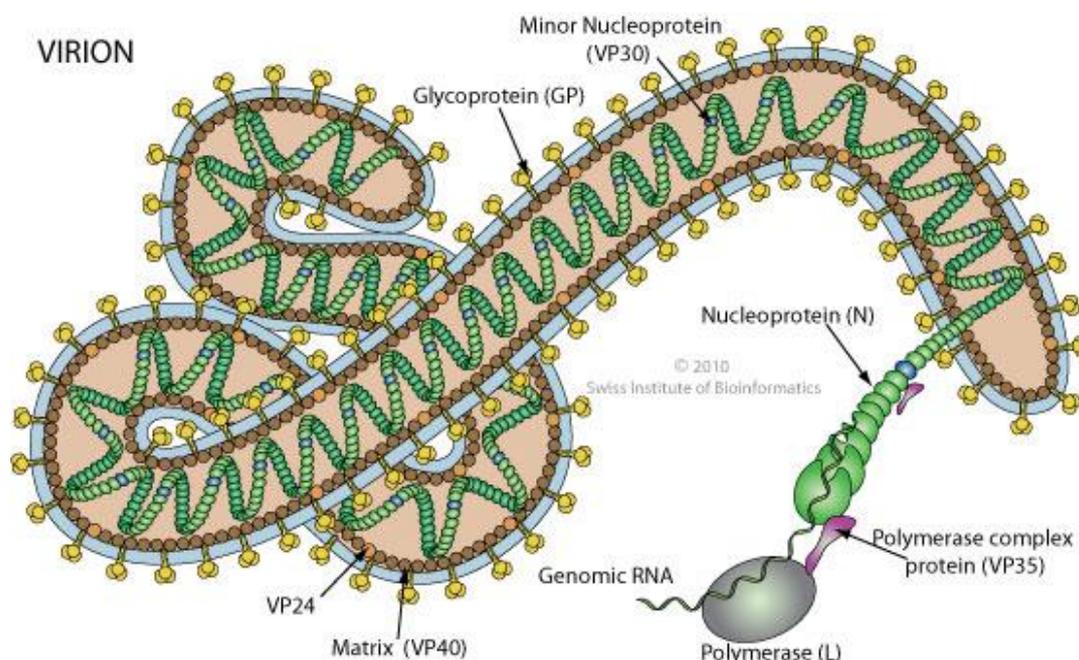


Figure-1 Ebola Virus

2. EBOLA OUTBREAKS

The Ebola virus causes a delicate serious illness which is often fatal if untreated. Ebola virus disease (EVD) first appeared 1976 in 2 coincident outbreaks one in Nzara, Sudan and the other in Yambuku democratic Republic of Congo. The latter occurred in a village near the Ebola River from which the disease takes its name. The current outbreak in west Africa (first cases notified in March 2014) is the largest and most multifaceted Ebola occurrence since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It has also spread between countries starting in Guinea then spreading across land borders to Sierra Leone and Liberia by air (1 traveller only) to Nigeria and by land (1 traveller) to Senegal.

The most severely affected countries Guinea, Sierra, Leone and Liberia have very weak health systems lacking human and infrastructural resources having immediately recently emerged from long periods of clash and instability. On August 8, the WHO Director General declared this outbreak a Public Health Emergency of International Concern. A separate distinct Ebola outbreak began in Boende Equateur an inaccessible part of the Democratic Republic of Congo. The virus family Filoviridae includes 3 genera: Cuevavirus, Marburgvirus and Ebola virus. There are 5 species that have been well-known Zaire Bundibugyo, Sudan, Reston and Tai Forest. The first 3 Bundibugyo Ebola virus Zaire ebola virus and Sudan ebola virus have been associated with large outbreaks in Africa. The virus causing the 2014 West African outbreak belongs to the Zaire species.

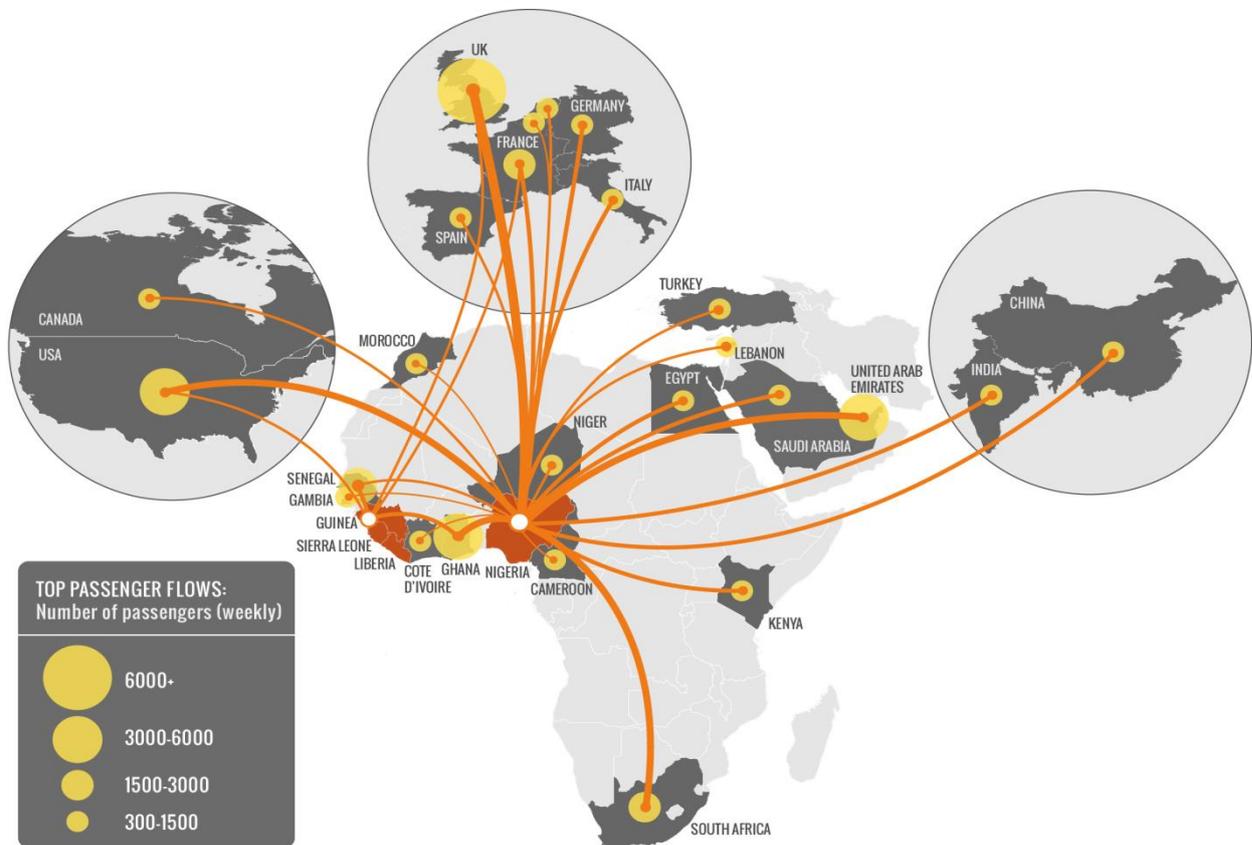


Figure-2 shows that Ebola traffic connections on the world

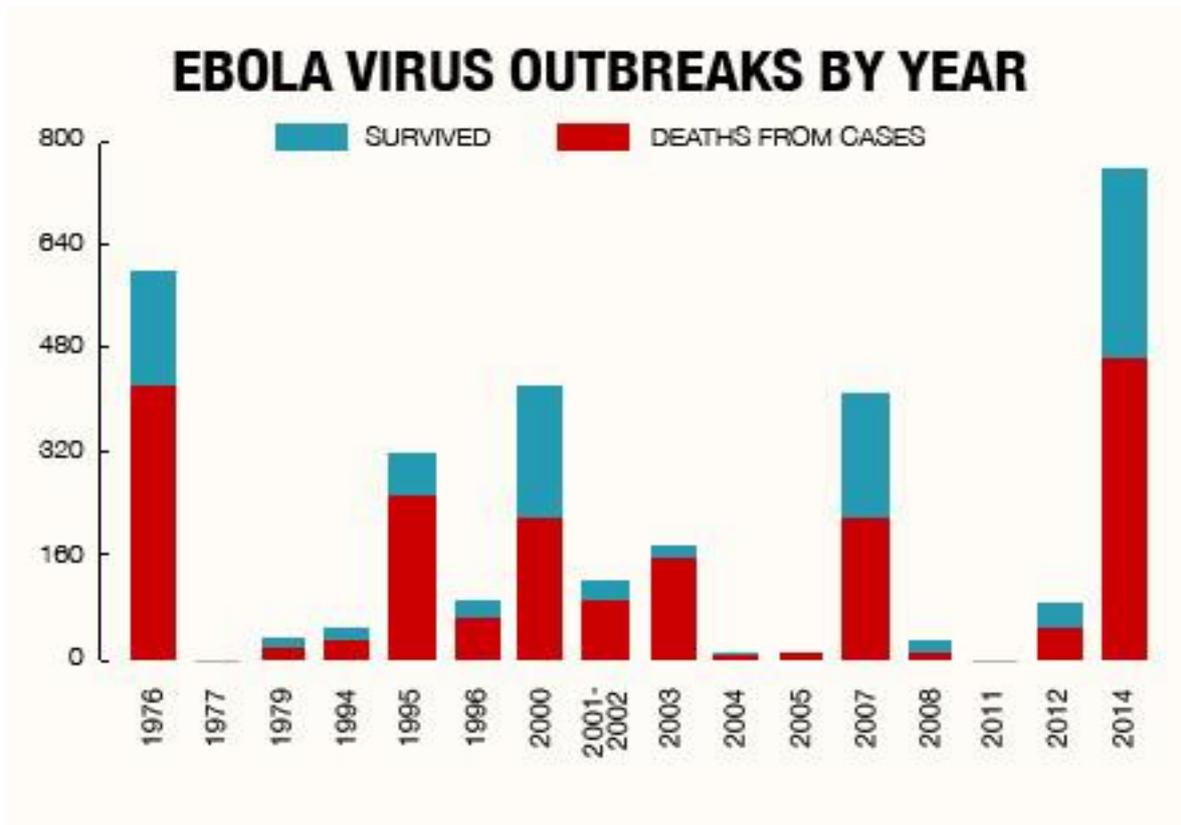


Table-1 shows Ebola outbreaks death cases & survived People (1976-2014) Data provided by WHO Dated: 1-Jul-2015

3. SYMPTOMS OF EBOLA VIRUS

The incubation stage that is the time intermission from infection with the virus to onset of Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola but the average is 8 to 10 days. Humans are not transferable until they develop symptoms. First symptoms are the sudden onset of fever fatigue, joint and muscle pain, headache, weakness, stomach pain, sore throat, high fever and lack of desire as well. As the diseases gets inferior it cause flow of blood inside and outside of body this is followed by vomiting, diarrhea, rash, symptoms of impaired kidney and liver function and in some cases both internal and external bleeding.

Symptoms of Ebola include

- ❖ High fever
- ❖ Red Eyes
- ❖ Severe headache
- ❖ Lack of appetite
- ❖ Muscle pain
- ❖ Pharynx and lungs
- ❖ Weakness
- ❖ Difficulty Breathing
- ❖ Fatigue
- ❖ Muscular aches & weakness
- ❖ Diarrhea
- ❖ Vomiting
- ❖ Stomach pain
- ❖ Unexplained hemorrhage (bleeding or bruising).
- ❖ Internal Bleeding.

Key point: Ebola virus kills up to 90% of people who are infected.

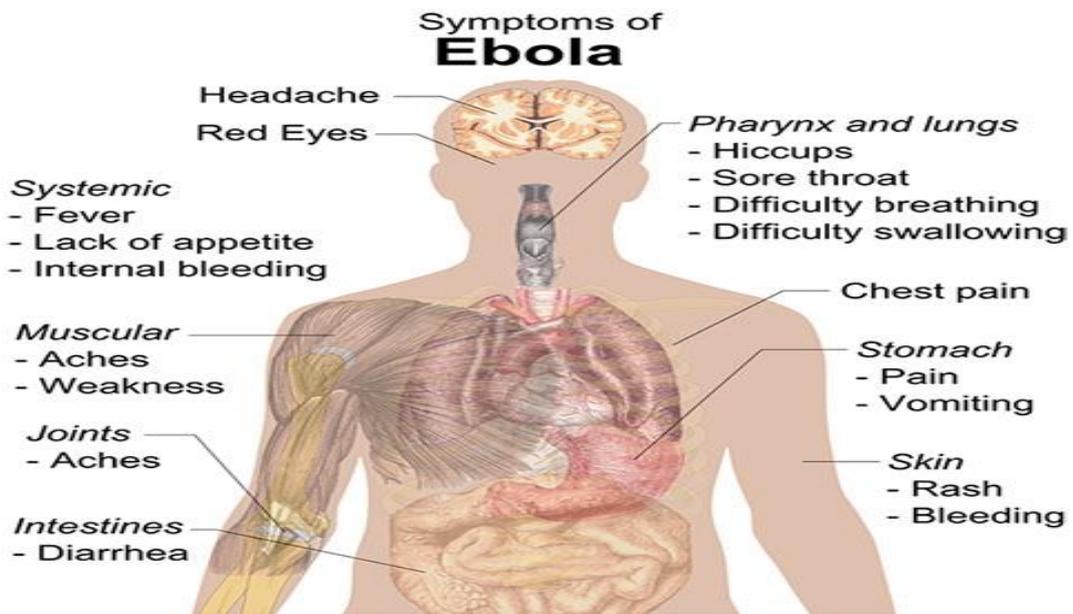


Figure-3 Shows the symptoms of Ebola Virus

Table presenting Causes symptom

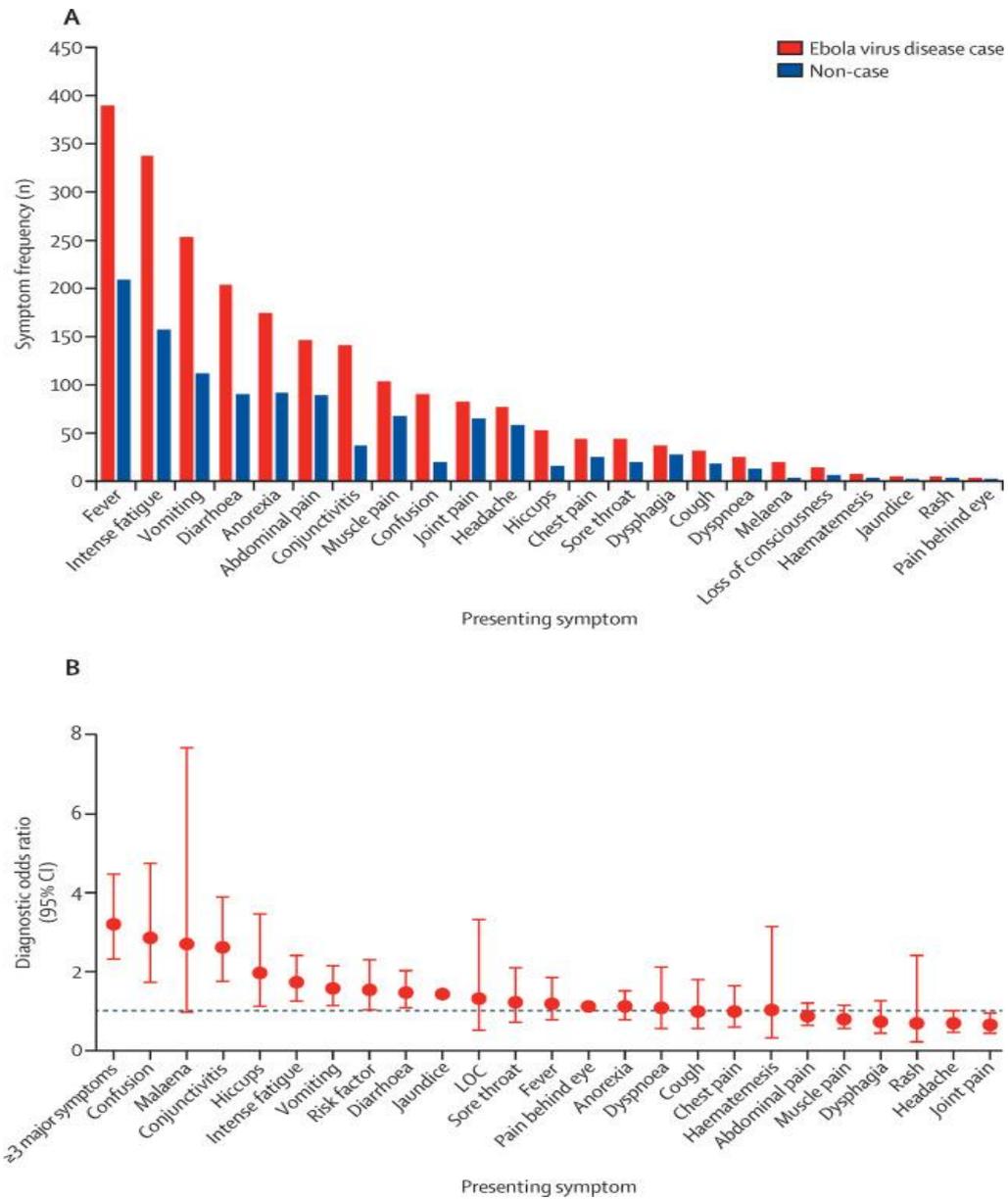


Table-2 shows that causes & symptoms of Ebola Virus

4. Prevention and Control

The primary Means of Preventing is Avoid to direct contact with the body fluid of infected people who has also surfing from that type of disease. Prevention focuses on avoiding contact with the viruses.

Good outbreak control relies on applying a package of interventions namely case management surveillance and contact tracing a good laboratory service safe burials and social mobilization. Community commitment is key to successfully controlling outbreaks.

Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is a useful way to reduce human transmission. Risk reduction messaging should focus on several factors: Reducing the risk of wild-life to human transmission from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other suitable protective clothing. Animal products (blood and meat) should be comprehensively cooked before consumption.

Reducing the risk of human-to-human transmission from direct or close contact with people with Ebola symptoms mostly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home. Regular hand washing is required after visiting patients in hospital as well as after taking care of patients at home. Outbreak control measures including rapid and safe burial of the dead identifying people who may have been in contact with someone infected with Ebola monitoring the health of contacts for 21 days the importance of separating the healthy from the sick to prevent further spread the importance of good hygiene and maintaining a clean atmosphere.

Following precautions can help prevent infection of Ebola:

- 1) Avoid areas of known outbreaks.
- 2) Wash your hands frequently.
- 3) Avoid bush meat.
- 4) Avoid contact with infected people
- 5) Follow infection-control procedures.
- 6) Don't handle remains.

Key point: You can't get Ebola from air, water, or food. A person who has Ebola but has no symptoms can't spread the disease either.



Figure-4 Ebola Prevention Kit

5. Treatment and Vaccines

Sympathetic care-rehydration with oral or intravenous fluids and treatment of specific symptoms improves survival. There is as yet no demonstrated treatment available for EVD. However a range of potential treatments including blood products immune therapies and drug therapies are currently being evaluated. No licensed vaccines are available yet but 2 potential vaccines are undergoing human safety testing. Experimental vaccines and treatments for Ebola are under development but they have not yet been fully tested for safety or effectiveness.

Key points:

- 1) Scientists are working on a variety of vaccines that would protect people from Ebola viruses. Some of the results have been promising but further testing is needed.
- 2) There are currently no proven treatment options that can kill the Ebola virus.



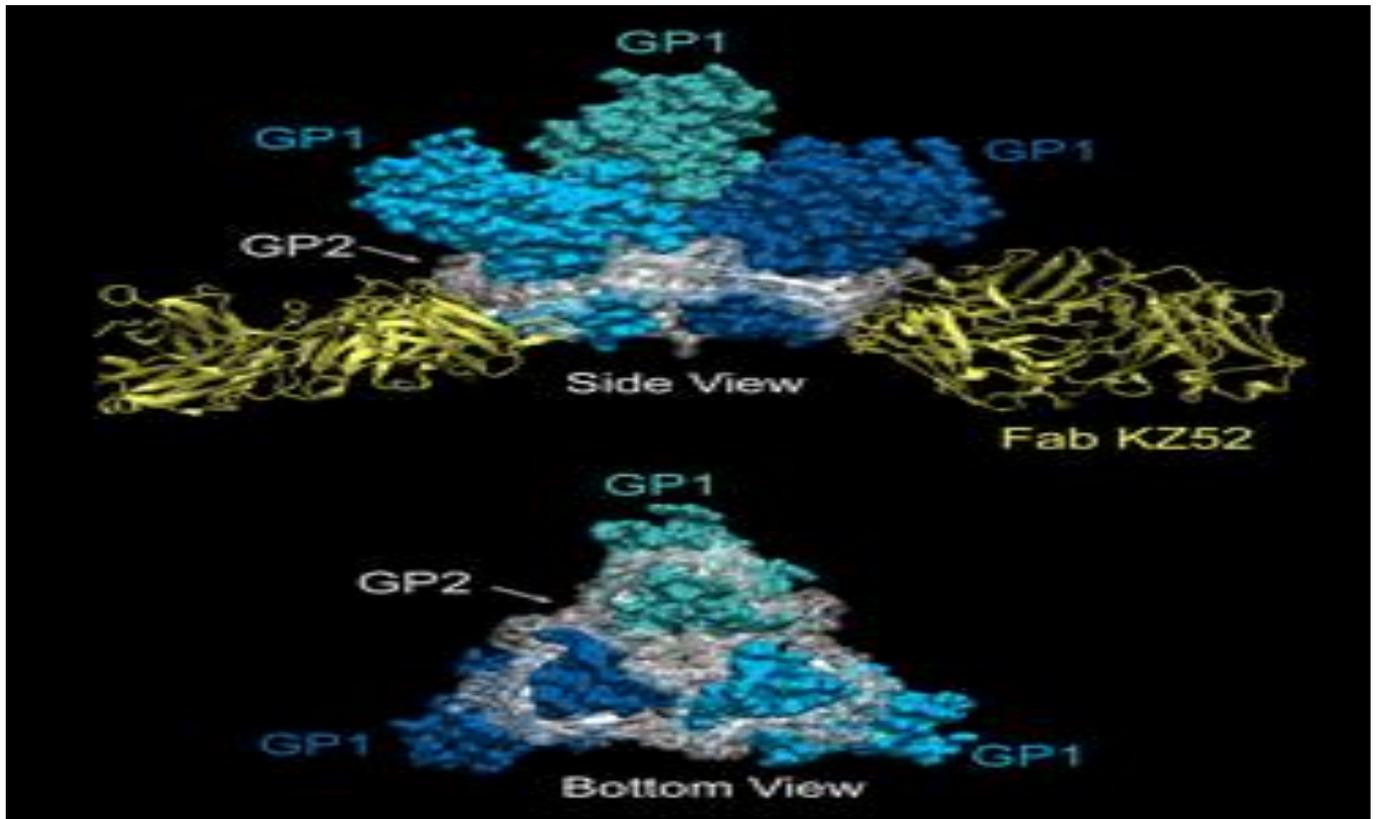
Figure-4 Treatment and Vaccines

6. Biochemical structure

The Biochemical structure of Ebola is made up of Glycoprotein Binds Glycoproteins are proteins that contain carbohydrate chains so called glycans is covalently attached to their polypeptide side chains a process known as glycosylation. The glycoprotein GP is the individual inhabitant of the Ebola virus surface and is responsible for attaching to and inflowing new host cells protecting the viral surface from immune surveillance and maintaining viral strength when outside host cells. However structures of viral glycoproteins in their native viral surface forms can be difficult to achieve as the proteins are oligomeric, metastable, and deeply glycosylated. To find one crystal that would diffract to 3.4Å and permit structure determination the Scripps researchers had to grow 50000 crystals and screen the 800 largest crystals. Their crystallized trimeric pre-fusion form of GP in complex with a neutralizing antibody derived from a human survivor of the 1995. Its biologically active form Ebola virus GP contains two subunits with separate structural and functional roles. GP1 is responsible for receptor commitment while GP2 mediates fusion of viral and host membranes.

The crystal arrangement showed that the 450-kDa GP is a trimer shaped like a three-lobed chalice with the bowl of the chalice formed by three GP1 subunits and the stem of the chalice fashioned from three GP2 subunits that embrace and enclose the GP1 trimer. Here portions of the GP2 (the internal

fusion loop and heptad repeat region collectively cover around GP1 and in turn hydrophobic residues of GP1 clamp the heptad repeat of GP2 into its metastable pre-fusion conformation. This clamp is released upon entry into the host cell through an at present unrevealed process allowing GP2 to spring into its more stable six-helix bundle conformation and trigger fusion of virus and host membranes. Hemorrhagic fever fatality ranges from 50% to 90%. The ebola virus operates via an envelope glycoprotein (GP) which is exclusively responsible for the virus' ability to transmit a disease to new cells. GP contains 676 amino acids broken up into two subsections covalently connected by disulfide bonds. The first subsection is responsible for attachment to the host cell. The second subsection integrates the viral envelope into the host cell membrane. The most promising method for blocking the virus involves the creation of a specific monoclonal antibody that targets GP1 or GP2.



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